

Claims

1. A method for obtaining a mixture constituted of solid components (21a, 21b,.. 21n), in a predetermined ratio comprising providing for each component a fluidized flow (24a, 24b,...24n) at a predetermined individual flow rate corresponding to the ratio of said component in the mixture; conveying each flow (24a, 24b,...24n) to the inlet (39) of a static mixer (32) exclusively by gravity, the mixer continuously producing at an outlet (38) a flow of the mixture (26).
2. The method of claim 1, further comprising: dispersing the flows inside the mixer.
3. The method of claim 2, wherein the dispersing comprises causing the flows to pass at least one static obstacle inserted in the flows.
4. The method according to any one of claims 1 to 3, further comprising monitoring an effective flow rate of one selected component of the mixture; and adjusting in real time the individual flow rates of each other components based on said effective flow rate.
5. The method according to any one of claims 1 to 4, wherein the step of providing a fluidized flow includes injecting air the container storing the into a component stored in a container so as to render the component flowable.
6. The method according to any preceding claim, wherein said mixture includes a cement and further comprising blending the mixture with water to form a slurry; pumping the slurry into an annulus of a well.
7. An apparatus for preparing a mixture of solid components in a predetermined ratio comprising reservoir means (31) for each individual components associated with individual flow generators (35), means associated to each flow generator (35) for adjusting said individual generated flow rate based on the ratio of each component, a static mixer (39) having an inlet (39) into which all individual flows are conveyed exclusively by gravity, said mixer (39) continuously producing at an outlet (38) a flow of mixture.
8. The apparatus of claim 7, wherein said means associated to each flow generator (35) for adjusting said individual generated flow rate based include knife gate valves.

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9. The apparatus of claim 7 or claim 8, wherein said reservoir means (31) is a hopper including lateral walls and a bottom with an opening, said hopper further comprising a grid extending from the lower portion of the lateral walls to the opening, and means for introducing air into the gap between the hopper bottom and the grid; said grid permeable to air but not to the component stored in the hopper.
10. The apparatus of claim 9, wherein the vertical walls of the hopper form an angle to the vertical ranging from 0 to 23°.
11. The apparatus according to claim 7, wherein the mixer (32) dispersing means (43) statically mounted inside the main body (41) so as to present an obstacle to the global flow entering the inlet (39).
12. The apparatus according to claim 7 or 8, further comprising: a Man Machine Interface (52) to input a mixture recipe; processing means to calculate for each component of the mixture the predetermined flow rate from a ratio of the components in the mixture recipe.
13. The apparatus according to claim 12, further comprising: a sensor system (64_a, 64_b) to measure a value of an effective flow rate of a selected component of the mixture, the sensor system producing a sensor signal indicative of the value of the effective flow rate of said component; an adjustable valve (66_a, 66_b), the effective flow rate of the component being adjusted depending on an opening of the adjustable valve; and wherein the adjustable valve and the sensor define a loop (62_a, 62_b), and the flow rate of the component being regulated to the predetermined flow rate using the sensor signal.